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ISH

Indoor air quality at work: a prerequisite for health and productivity

Frankfurt am Main, 10 December 2024. The quality of air at work plays a crucial role in employee well-being, health and performance. Whether in the office, working from home or in an industrial production facility, clean air is a key factor in ensuring a successful working day. A variety of parameters, such as CO_2 level, humidity, particulate matter, viruses and temperature, influence indoor-air quality and, therefore, people's working conditions.

CO_2 – the concentration killer

A key indicator of indoor-air quality is the CO_2 level. Outdoor air usually contains around 400 ppm (parts per million). In poorly ventilated indoor areas, however, it quickly rises to levels where people's well-being and ability to concentrate are impaired due to an insufficient supply of fresh air. Germany's Federal Environment Agency (UBA) recommends intensifying ventilation measures from a CO_2 level of 1,000 ppm; from 2,000 ppm, UBA considers indoor air quality to be "hygienically unacceptable". Headaches, tiredness and concentration problems are frequent consequences. Therefore, air exchange is essential to reduce CO_2 levels and ensure a pleasant working environment.

Nevertheless, many people in poorly ventilated rooms do not even realise that there is a need for the air to be exchanged. In such cases, the windows are usually only opened when someone points out that "the room is very stuffy". By contrast, air-conditioning and ventilation systems ensure the necessary exchange of air continuously and independently of the user. Thanks to modern air-conditioning and ventilation systems and CO_2 sensors, ventilation can be controlled specifically to promote the well-being of employees through high-quality indoor air and thus simultaneously increase productivity.

Filter systems – protection against harmful particles

Besides CO_2, indoor air can contain a variety of other contaminants that affect our well-being. For example, it can contain particulate matter, pollen, smoke, volatile organic compounds (VOCs) and even viruses. They can be removed using a variety of filter systems that function according to the type of pollutant in the air. Mechanical filters, such as those used in offices and residential buildings, remove dust and dirt particles. Absorption filters containing activated carbon are particularly effective at neutralising odours and gases and are often used in industrial settings or where the outside air is highly polluted. For industrial applications in particular, there are electrostatic filters that filter particles such as dust and smoke from the air by generating an electrical charge.

Photocatalytic filters, which use UV light to neutralise viruses and bacteria, are particularly important for sensitive areas such as hospitals or the food-processing industry. In some

cases, especially larger industrial facilities, a combination of several different filter types is used to remove as many pollutants as possible from the air and, if necessary, to inactivate germs.

Ventilation and air-conditioning systems – for an optimum indoor climate

Air-conditioning and ventilation systems play a major role in filtering pollutants out of the air at the same time as ensuring a healthy and pleasant indoor climate. From today's point of view, such systems are indispensable because they ensure high indoor-air quality by keeping pollutant levels low, filtering pollen and dust from the incoming air and, in winter, preventing dry indoor air by raising humidity levels. These systems not only have health benefits for employees, they can also help improve productivity and concentration levels at the same time as saving energy by means of heat recovery.

Influence on materials and buildings

In addition to the health benefits, indoor air also has a direct impact on materials and the fabric of buildings. If the humidity is too high, paper, for example, can begin to curl. Excess moisture can also lead to the formation of mould and thus damage the structure of the building. On the other hand, too little humidity causes building materials to dry out, leading to cracks in wood, for example. Moreover, VOCs and other pollutants can cause corrosion and metal discolouration, something that can be particularly problematic in industries using large quantities of materials.

For this reason, investing in air-conditioning and ventilation systems makes sense from the point of view of employee health, economics and energy efficiency. These systems not only protect employees but also help to keep materials and building structures in good condition over the long term. “Ventilation and air-conditioning systems should be a matter of course in all indoor workplaces, as they automatically and reliably ensure the necessary exchange of air,” says Frank Ernst, Managing Director of the Association of Air Conditioning and Ventilation in Buildings (FGK). “With a demand-controlled supply of filtered, pre-heated outside air, ventilation and air-conditioning systems ensure that indoor air is healthy and pleasant. They also allow heat and sound proofed windows in modern buildings to perform effectively, because they don’t need to be opened. It is best to plan air-conditioning and ventilation systems as part of new builds and major refurbishments from the outset. For retrofitting in existing buildings, single-room systems are ideal, which, as floor, wall or ceiling-mounted units, only require two ducts through the outer wall and a power connection, as well as a little space in the room.”

During the planning and installation phases, it is essential that account is taken of all relevant building and usage-specific information. Specialist planners help to find the best solution for each specific case. Going without air-conditioning and ventilation systems is certainly the worst choice, not only in terms of employee health and performance but also regarding energy efficiency.

Exhibitors at the world's leading trade fair for HVAC and Water present state-of-the-art solutions for optimising indoor air quality. Source: Messe Frankfurt Exhibition GmbH.

Solutions for optimal indoor-air quality at ISH 2025

Indoor-air quality plays a leading role in people's well-being, health and performance. At ISH, which will open its doors in Frankfurt am Main from 17 to 21 March 2025, leading manufacturers and innovators from the field of indoor-air solutions will present the latest technologies for ensuring a good indoor climate. Their innovations set new standards of efficiency, comfort and sustainability and are used in buildings of many different kinds: residential and non-residential buildings, production facilities, data centres, retail outlets and educational and healthcare centres. Information about this thematic category can be found here.

ISH is also accompanied by a varied complementary programme of events. One of the highlights will be the ‘Building Future Conference’ in the ‘Portalhaus’ of Frankfurt Fair and Exhibition Centre, where the discussion will revolve around climate-friendly solutions for the building sector. Experts from politics and local authorities, the property and housing industry, energy suppliers as well as planners, architects and project developers will meet there to develop joint strategies for sustainable building and energy concepts. The conference is being organised by Messe Frankfurt in cooperation with the Federation of German Heating Industry (BDH), the Association of Air Conditioning and Ventilation in Buildings (FGK), the German Association for Energy Efficiency in Building Services (VdZ), the German Sanitation, Heating and Air Conditioning Association (ZVSHK) and other national and international partners.

Full details at a glance

Visitors will find a comprehensive overview of the solution fields and events, as well as exhibitor information, on the ISH 2025 website at www.ish.messefrankfurt.com

ISH – The World's Leading Trade Fair for HVAC and Water
The next ISH will be held from 17 to 21 March 2025.

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